REMARKS

Claims 1-17 are pending in the application with claims 1, 14 and 15 being independent. Claim 15 is proposed to be amended to better clarify the claimed invention and is not meant to be a narrowing amendment. Entry of the amendment to claim 15 is respectfully requested. No new matter as been added. Reconsideration of the application is respectfully requested in view of the proposed amendment and following remarks.

Acknowledgement of Foreign Priority
And Receipt of Certified Document

In the Office Action Summary, the Examiner has again indicated that none of the certified copies of the priority documents have been received. This appears to be in error. Applicants request the Examiner's acknowledgement of Applicants' claim for foreign priority under 35 U.S.C. §119 and the receipt of the certified copy of the priority document that was filed July 7, 2004. The claim for priority expressly appears on the Image File Wrapper (IFW) and the priority document appears to be the listed artifact in the IFW. This is a second request for an acknowledgement. If there is indeed an issue with the priority document, a clear explanation is hereby requested as to the specific nature of the problem. Applicants believe the submission of the certified copy has been accomplished and has been recorded by the Office.

35 U.S.C. §103(a) Rejections

Claims 1-2 and 13-14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,012,405 to Nishida, *et al.* ("Nishida") in view of U.S. Patent No. 5,675,816 to Hiyoshi, *et al.* ("Hiyoshi"). Claims 3-5 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Nishida in view of Hiyoshi as applied to claim 1, and further in view of U.S. Patent No. 6,124,700 to Nagai et al. ("Nagai"). Claims 6-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Nishida in view of Hiyoshi, and further in view of U.S. Patent No. 6,483,272 Terada *et al.* ("Terada"). Claims 15-17 have been rejected under 35

U.S.C. §103(a) as being unpatentable over Nishida in view of U.S. Patent No. 6,522,102 to Cheiky et al. ("Cheiky"). Applicants respectfully traverse this rejection.

Referring the Examiner now to MPEP § 2143, titled "**Basic Requirements for a *Prima Facie* case of Obviousness**", the MPEP mandates that:

> *To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claimed limitations.* (Emphasis added)

Applicants submit that there is no motivation to combine the disclosures of Nishida and Hiyoshi. Moreover, the Nishida and Hiyoshi references do not disclose or suggest all the limitations of the invention of independent claims 1 and 14, either singly or in combination. Moreover, the combination of Nishida and Cheiky fail to disclose all the claimed limitations, and Cheiky actually teaches away from the invention of independent claim 15. Hence there has been no *prima facie* case of obviousness demonstrated.

Claim 1 recites, in part:

> *a battery voltage detecting circuit that detects a voltage across the battery before charging the battery;*
>
> *a control device that selects one of the predetermined number of voltages depending upon the detected voltage across the battery before the charging of the battery and then controls the switch to turn ON so that a rush current does not flow in the battery at the start of charging.* (Emphasis added)

Applicants respectfully submit that several features required by claim 1 are not disclosed or suggested by the combination of the Nishida and Hiyoshi references: firstly, a battery voltage detecting circuit that detects a voltage across the battery before charging the battery; secondly, the control device that selects one of the predetermined number of voltages

depending upon the detected voltage across the battery; thirdly, the control device selects one of the predetermined number of voltages before charging the battery. To prevent a rush current from flowing in the battery, detection of the battery voltage and selection of the output voltage to be applied to the battery have to be performed before the start of charging. Further, a relevant output voltage has to be selected depending upon the detected battery voltage to prevent the rush current.

With respect to the primary reference to Nishida, figure 1 schematically shows a constant voltage generation circuit 21 that applies constant voltages E1, E2, and E3 to a voltage switch circuit 22. One of the three voltages E1, E2 and E3 is selectively applied to the non-inverting input terminal of an operational amplifier 23. As can be appreciated from the flowchart shown in figure 3, voltage E1 is selected after pre-charging (S3) and voltage E3 is selected after charging the battery with the voltage E1. As such, in Nishida, selection of the constant voltages is performed during the charging sequence, not before the start of charging as required by claim 1.

Hiyoshi discloses restricting a rush current which may flow before a start of the charging. However, Hiyoshi fails to disclose or suggest "a battery voltage detecting circuit that detects a voltage across the battery before charging the battery." In Hiyoshi, although it is contemplated to restrict the rush current, the way to achieve the restriction is completely different from the invention of claim 1. Claim 1 requires the detection of the battery voltage before start of charging and the output voltage to be applied to the battery is selected depending on the detected battery voltage. Hiyoshi does not teach this feature.

Moreover, Claim 1, and similarly claim 14, recite, in part:

> *a switch that is connected between the power supply circuit and the battery and is turned ON to allow charging of the battery and OFF to interrupt the power supply circuit from the battery;*
>
> *a control device that selects one of the predetermined number of voltages depending upon the detected voltage across the battery before the charging of the battery and then controls the switch to turn ON so that a rush current does not flow in the battery at the start of charging.* (Emphasis added)

But, contrast, the Nishida charging circuit for a secondary battery 11 which includes an adapter detection circuit 2, a voltage detection circuit 3 and a constant-voltage circuit 4 that charges the battery at a constant-voltage. Also included is a constant-current circuit 5 and a charge control circuit 6 that causes charging on the battery 11 (col. 7, lines 12-36, Fig. 1). The constant-voltage circuit 4 includes a constant-voltage generation circuit 21, a voltage switch circuit 22, an operational amplifier 23, a control transistor 24, a diode 25 and gate control circuit 26. The constant-voltage generation circuit 24 outputs three voltages E1 through E3, where $E2 \geq E1 > E3$ (col. 8, lines 21-27). As admitted by the Examiner, Nishida does not disclose "*a control device that selects one of the predetermined number of voltages depending upon the detected voltage across the battery before the charging of the battery and then controls the switch to turn ON so that a rush current does not flow in the battery at the start of charging.*"

But, contrary to the Examiner's assertion, Applicants respectfully submit that there is no motivation to combine the stabilization circuit 292 of Hiyoshi with the battery charging circuitry of Nishida because the stabilization circuit 292 of Hiyoshi is primarily meant to hold the charging current to the battery constant, including restricting rush current (col. 19, lines 47-49). But, Nishida already provides for a constant current circuit 5; and, the constant current circuit 5 of Nishida is under control of the charge control circuit 6 (col. 7, lines 27-37). However, the stabilization circuit 292 of Hiyoshi has no control signal capability. Therefore, if arguendo, one were to replace the constant current source 5 of Nishida (otherwise there would be two constant current sources, which is certainly no motivation) with the stabilizing circuit 292 of Hiyoshi, then the principle of operation of Nishida would be destroyed, since there is no way to control the constant current source (i.e., stabilization circuit 292) as taught by Nishida.

Moreover, the proposed combination of the stabilization circuit 292 of Hiyoshi with the battery charging circuitry of Nishida appears to add unnecessary cost which is certainly not a motivation to combine these two references. That is, in contrast, the invention avoids such "additional circuitry and costs" (such as the stabilization circuit 292) as proposed by the

Examiner, while still ensuring "a rush current does not flow in the battery at the start of charging."

Additionally, it is certainly not at all clear how, if at all possible, how one of ordinary skill in the art would combine the battery charging circuit of Nishida with the stabilization circuit of Hiyoshi in an attempt to provide the claimed limitations. Referring to the explanation provided by the Examiner when proposing the combination of Nishida and Hiyoshi on pages 2-3 of the Office Action, the Examiner states:

> *[h]owever, Nishida et. al. do not disclose explicitly, controls the switch to turn ON so that a rush current does not flow in the battery at the start of charging. Hiyoshi et al. disclose in Figure 10, element 292, a stabilization circuit that resists rash (sic) current at the time of the start of the charging current, controls the switch to turn ON so that a rush current does not flow in the battery at the start of charging (column 19, lines 41-54)*

The Examiner admits that Nishida does not disclose any teaching of a device that "controls the switch to turn ON so that a rush current does not flow..." Applicants respectfully submit that the cited passage (col. 19, 41-54) of Hiyoshi also fails to supply this missing feature. The cited passage of Hiyoshi simply discloses that a stabilization circuit is provided, but fails to supply the missing limitations of Nishida, such as "a switch that is connected between the power supply circuit and the battery and is turned ON to allow charging of the battery and OFF to interrupt the power supply circuit from the battery." Moreover, Applicants submit that the switch 36 of Nishida is not "connected between the power supply circuit and the battery" as purported by the Examiner. Therefore, Applicants submit that there is no motivation to combine the Nishida and Hiyoshi references.

Applicants respectfully submit that for at least the reasons stated above, claims 1 and 14 and those claims depending therefrom are allowable.

As to independent claim 15, the Examiner admits that Nishida does not disclose a "first step of selecting a voltage having the third voltage level before the battery is connected" and looks to Cheiky to provide the missing limitation. However, Applicants submit that Nishida also fails to provide another limitation of claim 15, discussed below. Moreover, Cheiky does not

provide or suggest the missing limitation as alleged by the Examiner, and in fact teaches away from the invention of claim 15.

Independent claim 15 recites, in part:

> a power supply circuit that produces a predetermined number of voltages having a first level, a second level which is lower than the first level and a third level which is lower than the second level, and a selected one of the predetermined number of voltages being applied to the battery;
>
> first step of selecting a voltage having the third level before the battery is connected;
>
> second step of selecting a voltage from the first, second and third levels to be applied to the battery after the battery is connected, depending upon the voltage across the battery detected by the battery voltage detecting circuit; and
>
> third step of selecting a voltage having the first level to be applied to the battery after the second step. (Emphasis added)

Applicants disagree with the Examiner's assertion on page 7 of the Office Action that Nishida discloses: "second step of selecting a voltage from the first, second and third levels to be applied to the battery after the battery is connected, depending upon the voltage across the battery detected by the battery voltage detecting circuit." This second step of claim 15 requires the selection of a voltage from three levels (first, second and third) depending on the voltage across the battery detected by the battery voltage detection circuit. However, Nishida does not disclose such capability. For example, at col. 11, lines 21-23 in reference to Fig. 3, step S4, Nishida discloses that the voltage E1 is applied to the battery to perform charging (this is the first voltage for charging). At lines 24-34, Nishida discloses at step S5 a check if the battery voltage exceeds a voltage E1 and if so, then at S6, voltage E3 is selected. However, this does not fulfill the requirements of claim 15. Claim 15 requires: "second step of selecting a voltage from the first, second and third levels to be applied to the battery after the battery is connected, depending upon the voltage across the battery detected by the battery voltage detecting circuit." Nishida does not select from among three voltages depending on the voltage across the battery detected by the

battery voltage detecting circuit. Rather, Nishida always selects voltage E3, and cannot select from among three voltages, depending upon the voltage across the battery detected by the battery voltage detecting circuit, as required by claim 15.

Furthermore, Cheiky does not provide or suggest the missing limitation as alleged by the Examiner, and in fact teaches away from the invention of claim 15. Cheiky is directed to a battery charging method and system wherein in an embodiment utilizing three voltages (e.g., Fig. 2), a battery may be charged at a first voltage for a first duration (step 112), charged at a second voltage for a second duration (step 113), checking if the battery is fully charged (step 114) (or if total charge time exceeds a third time duration) and, if so, setting the voltage to a third voltage (step 116).

However, contrary to the Examiner's assertion on page 7 of the Office Action that Chieky is teaching a first step of selecting a voltage level from the third level before the battery is connected, Cheiky is actually disclosing selecting from the second voltage level, as the first step. A careful examination of col. 10, lines 5-26 shows this clearly. At line 6 (step 1), and following lines, Cheiky states to charge at the first voltage which is substantially equal to voltage V2 (208) which is substantially equal to the second plateau (of Fig. 3), for the first time duration T1. Clearly V2 (208) is not the lowest voltage in Fig. 3, rather, V1 (210) is the lowest of the three voltages. Further, Cheiky discloses at col. 10, lines 12-17, to then charge at the second voltage V3 (209) for duration T2. Voltage V3 (209) is the highest voltage. At col. 10, lines 20-25, Cheiky then discloses charging at the third voltage V1 (210), which is the lowest voltage, prior to ceasing battery charging. Clearly, Cheiky discloses that the second voltage level (V2) is selected first, followed by V3 (highest), and then followed by V1 (lowest). This disclosure is different from the requirements of independent claim 15.

Applicants submit that neither Nishida nor Cheiky, nor any other art of record, either singly or in combination, disclose or suggest all the limitations of independent claim 15. Applicants submit that independent claim 15, and those claims depending therefrom, are now allowable.

The Examiner relies on Nagai to allegedly provide a missing limitation of Nishida and Hiyoshi in regards to claims 3-5 of controlling the switch to turn on after expiration of a predetermined period of time form a time when the voltage is equal to or close to the voltage detected by the battery voltage detecting circuit. However, although Applicants disagree with this assertion, claims 3-5 depend from an allowable independent claim 1 and therefore are allowable for at least this reason.

The Examiner relies on Terada to allegedly provide a missing limitation of Nishida and Hiyoshi in regards to claims 6 and 7 of a battery connection detecting device that detects the battery is connected for being charged. However, although Applicants disagree with this assertion, claims 6 and 7 depend indirectly from an allowable independent claim 1 and therefore are allowable for at least this reason.

The 35 U.S.C. §103(a) rejections should now be withdrawn.

Pursuant to MPEP §714.13, Applicants contend that entry of the amendment is appropriate because the proposed amended claim avoids the rejections set forth in the last Office Action, resulting in the application being placed in condition for allowance, or, alternatively, the revised claims place the application in better condition for purposes of appeal. Furthermore, the revised claims do not present any new issues that would require any further consideration and/or search by the Examiner, and the amendment does not present any additional claims without canceling a like number of pending claims. Accordingly, entry of the present amendment is respectfully requested.

CONCLUSION

In view of the foregoing remarks, Applicants submit that all of the pending rejections has been properly addressed or rendered moot, or alternatively, in better condition for appeal. The Examiner is respectfully requested to promptly pass the above application to allowance issue.

The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicant hereby makes a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 23-1951.

Respectfully submitted,

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